

Assessment of Pennsylvania's Bonding Program for Primacy Coal Mining Permits

Permit Forfeiture and Land Reclamation Status Report

(for the period July 31, 1982 to November 30, 1999)



Office of Mineral Resources Management
Bureau of Mining and Reclamation

February 2000

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Commonwealth of Pennsylvania

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Department of Environmental Protection (DEP) regulations at 25 Pa Code Chapter 86, Section 86.145 require that existing guidelines for coal permit bonding rates shall be reviewed and, if necessary, revised annually to reflect the current cost of forfeiture reclamation to the department. This report assesses the historical, current and future projected costs of land reclamation actually incurred and expected to be incurred by the department on forfeited primacy coal permit sites and identifies the income available to complete this reclamation.

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EXECUTIVE SUMMARY

Since the 1960s, Pennsylvania has been a national leader in implementing actions to ensure mine reclamation. In more recent years, under the leadership of Gov. Ridge, the Department of Environmental Protection (DEP) has intensified these efforts. One key element in successfully fulfilling the mining program's mandates is an understanding of the various customers with an interest in the industry. These customers span the range from active mining operations that are regulated by DEP to local volunteer watershed associations working to correct the problems resulting from abandoned mining operations. DEP conducted a comprehensive assessment of its customers' needs four years ago and has used the results to develop many of its recent mining and reclamation initiatives.

Reclaim PA is one initiative that is an outgrowth of the customer needs assessment. Gov. Ridge publicly announced Reclaim PA in October 1998 after it was developed in partnership with the Mining and Reclamation Advisory Board. The program is designed to maximize reclamation of the commonwealth's quarter-million acres of abandoned mineral extraction lands. This 200-year legacy of abandoned mineral extraction operations pollutes the commonwealth's land, water and air. These scars are the result of fueling the Industrial Revolution and the two World Wars.

Reclaim PA represents a combination of efforts designed to increase abandoned mine reclamation. Examples of these efforts include increasing public and private participation and encouraging more re-mining by the active coal mining industry.

In addition to the efforts directed at abandoned mine lands, the customer needs assessment also provided a blueprint for DEP efforts on active mining operations. DEP recognized that two activities were key to ensuring that a mining operation would not have an unacceptable impact on the environment. The first activity identified was the permitting decisions made for new mining operations. The second important issue was to ensure that the bonding program had the ability to fully complete reclamation on a site when an operator could not. Consequently, these two activities were given much greater scrutiny.

In the 1980s, DEP implemented new permitting requirements designed to prevent the creation of post-mining discharges and has continued to refine various tools that have proven effective, such as overburden analysis and acid-based accounting. In a study conducted between 1997 and 1999, the success of these measures was demonstrated through an analysis of coal mining permits that resulted in acid mine drainage. The study found that of the 1,699 permits issued between 1987 and 1996, less than one percent caused long-term post-mining discharges that did not meet effluent limits. By contrast, more than 15 percent of permits issued through the early 1980s resulted in post-mining discharges. This effort confirmed the effectiveness of the department's current approach in evaluating permit applications.

The second issue to be evaluated was the status of the bonding program, which had been adjusted only once since its implementation in 1982. This report represents the culmination of these efforts that are described in more detail in the following pages. It also provides

clarification for DEP's decision to implement a full-cost bonding system for those categories of coal mining activities that are not yet included.

Since July 31, 1982, Pennsylvania has had primary responsibility for regulating its surface coal mining industry, a status commonly known as "primacy". One aspect of this regulatory activity is to implement Pennsylvania's state law consistent with federal guidelines that require all surface coal mining activities to have bonds posted to guarantee completion of all reclamation obligations. Since achieving primacy, Pennsylvania has used two mechanisms to implement this requirement -- an alternative bonding system for surface coal mining, coal refuse reprocessing and coal preparation plants, and a full-cost bonding system for coal refuse disposal and the surface activities related to underground coal mining.

The basic concept underlying the bonding program is that each operation should have a bond posted that is directly related to the site and potential reclamation obligations. If the bond posted for the site is forfeited, the proceeds of the forfeiture are used to perform reclamation on that site. This concept is implemented, without modification, in Pennsylvania's full-cost bonding program for coal refuse disposal and surface activities related to underground mining. The alternative bonding system typifies an approach that is significantly different in one respect: in addition to paying a flat per acre site-specific bond, each operation contributes to a "pool" of funds that can then be used to supplement forfeited bonds on any site that is covered by the pool. The contribution required for each operation is based on the area to be affected by the coal mining activity, not on the specific potential reclamation needs of that site. Neither the flat per acre fee nor an operation's contribution to the bond pool is directly related to potential reclamation needs on a specific site. Experience has shown that this approach "masks" the potential reclamation obligations of individual operations and makes it very difficult for the department to ensure that sufficient bonds have been posted to cover all potential reclamation needs.

The review of Pennsylvania's bonding program, including the alternative bonding system, has identified deficits for outstanding land reclamation that present potential negative environmental impacts. This review has included consideration of land reclamation only. Any expenditures needed to correct water pollution problems are being assessed separately.

This report identifies shortcomings in the current bonding system. The effort that is described is part of DEP's ongoing work to protect Pennsylvania's environment by maximizing reclamation, while also maintaining a healthy and productive coal industry.

As a result of these and other efforts, including ongoing informal assessments, it became evident that the current bonding program is not adequate to ensure reclamation of forfeited sites. In the spring of 1999, DEP initiated this study of the bonding system. Currently, bonds are set at a fixed amount per acre depending on the type of surface coal mining activity. The review of forfeited sites that still needed to be reclaimed and the amount of bonds and reclamation fees that were collected plus expected future forfeitures has helped to quantify the level of the deficit associated with the operation of the alternative bonding system.

The alternative bonding system originally approved by the federal Office of Surface Mining (OSM) was intended to cover only land reclamation. However, because of an interpretation by

OSM subsequent to Pennsylvania achieving primacy, the responsibility for water pollution was made a part of Pennsylvania's approved primacy program.

The existing alternative bonding system bond program currently has a deficit of \$5.5 million for land reclamation. (Details on the assumptions affecting this result can be found in the discussion on *Alternative Bonding System – Surface Mining Activities* on page 9). Following the initial analysis of this data, in October 1999 DEP announced a new approach to bonding. Under the Full Cost Land Reclamation Bonding Program, DEP intends to set bond amounts for surface coal mining operations on a site-specific basis, rather than using a flat per-acre fee for every mining site backed by a bond pool. The bond requirement will fully reflect the department's estimated cost for reclamation based on the cost of backfilling, regrading and revegetating the site.

It is expected that the conversion to a full-cost bonding system will prevent these deficits from increasing. With regard to the existing deficit, DEP intends to reduce it by applying available resources that are authorized to be used for purposes associated with the bonding program. A total of \$700,000 has been applied in the current fiscal year, and it is estimated that up to \$1 million could be applied annually in future years.

The analysis has also identified shortfalls in the guidelines for the activities covered by the full-cost bonding program. For coal refuse disposal, the guidelines resulted in an overall shortfall of approximately \$4.5 million. For surface activities associated with underground mining, the estimated shortfall is approximately \$2.5 million. DEP will be revising the bonding guidelines for these two activities to ensure that the proceeds from forfeitures cover all reclamation needs for individual sites.

This assessment documents the current status of the bonding program for land reclamation and satisfies DEP's obligation to perform an annual assessment as required by 25Pa. Code §86.145.

Introduction

Surface coal mining activities in Pennsylvania include surface mining, coal refuse reprocessing, coal preparation plants, coal refuse disposal and surface activities associated with underground coal mines. All surface coal mining activities are required by Pennsylvania law to have bonds posted to guarantee completion of all reclamation obligations required by permit. Under state and federal mining laws, the bonding program is required to set rates at levels that will generate adequate funds to complete outstanding reclamation obligations due to forfeitures (30 U.S.C. § 1259; 30 CFR § 800.14(b); 52 P.S. §§ 1396.4(d), 30.56, 1406.6; 35 P.S. 691.315; 25 Pa. Code Ch. 86, Subchapter F).

Pennsylvania has two mechanisms to provide this required financial guarantee: an alternative bonding system and a full-cost bonding system. The alternative bonding program covers surface coal mining, coal refuse reprocessing and coal preparation plants. This program requires a bond to be posted for each permit site. The bond posted for a specific site is used to deal with reclamation obligations at that site. In addition, a reclamation fee is collected. Proceeds from the reclamation fee may be used to supplement payment for reclamation obligations at any site that is covered by the alternative bonding system. Account balances for the alternative bonding system are maintained in the Surface Mining Conservation and Reclamation Fund.

The remaining two surface mining activities – coal refuse disposal and surface activities associated with underground coal mines – are covered by full-cost bonding provisions. Under these programs, a bond is posted to cover the full cost of reclamation at individual sites. The proceeds of bond forfeitures on coal refuse disposal sites are maintained in the Coal Refuse Disposal Control Fund, and balances for forfeitures related to surface activities associated with underground mines are maintained in the Bituminous Mine Subsidence and Land Conservation Fund.

Permit Bond Rates

A minimum bond amount is required for an entire permit area, as well as a per acre bond amount based on the type of operational areas within the total permit area. A minimum bond of \$10,000 is required for all bituminous coal mining activities and both anthracite and bituminous coal refuse disposal operations. A \$5,000 minimum bond is required for all anthracite coal mining activities, except coal refuse disposal operations. In addition to satisfying this minimum bonding requirement, there is a per acre bond rate based on the type of mining activity and the specific land use on the permit site. These rates are described in Table 1.

**Table 1
Current Bonding Rates**

Activity	Variables	Bond Amount
Surface Coal	Support areas	\$1,000 / acre
	Highwall: 0 – 85 feet	\$3,000 / acre
	Highwall: 86 – 115 feet	\$4,000 / acre
	Highwall: 116 – 150 feet	\$5,000 / acre
	Highwall: > 150 feet	Site-specific evaluation
Coal Preparation Plants	Land reclamation	\$3,000 / acre
	Demolition of structures	Site-specific evaluation
Coal Refuse Reprocessing		\$1,000 / acre
Coal Refuse Disposal		\$1,000 / acre

Surface coal permits have a bond rate of \$1,000 per acre for support areas and a variable rate for pit areas based on the height of the highwall. For heights between 0-85 feet the rate is \$3,000 per acre, \$4,000 per acre for heights of 86-115 feet, and \$5,000 per acre for heights of 116-150 feet. For heights greater than 150 feet the bond rate is based on site specific criteria. Coal refuse reprocessing and coal refuse disposal permit sites are bonded at \$1,000 per acre. Coal preparation plants are bonded at \$3,000 per acre, plus a site specific bond amount based on the estimated demolition cost to remove structures after the site ceases operation.

Collection of Forfeited Bonds

Historically, the department has collected a high percentage of the forfeited primacy bonds. There are several reasons that some forfeited bonds remain uncollected at any point in time. One obvious reason is that for some of the more recent forfeitures the process of collection is ongoing. In other cases, the forfeiture action may be under appeal. Sometimes the surety company or banking establishment that has written the bond has gone bankrupt. In other cases, the department may be holding bonds for a site that is being reclaimed under a consent agreement, and collection or release of bonds will not occur until the site is reclaimed. The historical collection rates for the various categories of coal mining are summarized in Table 2. The estimated revenues from future forfeiture collections discussed in the section *Current Status of Primacy Forfeiture Reclamation Program* are based on the assumption that collection rates will continue at the levels described here.

**Table 2
Collection Rates of Forfeited Bonds**

Activity	Collection Rate
Surface Coal	92%
Coal Preparation Plants	80%
Coal Refuse Reprocessing	97%
Coal Refuse Disposal	91%
Underground Mining	100%

The Alternative Bonding System¹

Pennsylvania implemented its alternative bonding system on Aug. 1, 1981, by establishing a per acre bond supplemented by a \$50 per acre reclamation fee. Originally, the reclamation fee was used for any bond forfeited site. Prior to the first primacy forfeiture in 1985, the fund was used to reclaim interim program sites. In 1985, the department produced a report entitled *PENNSYLVANIA'S SURFACE MINE BOND FORFEITURE PROGRAM – The Problem and Reclamation Options*. This report committed the department to provide funds necessary to assure reclamation of all sites having primacy permits through the use of the reclamation fund. This commitment was put into regulatory form in Chapter 86.189(a) and requires the department to give reclamation priority to primacy sites. This regulation became effective on Feb. 7, 1987. On March 11, 1988, the Secretary reiterated the commitment by instituting a management directive restricting the use of reclamation fees to primacy forfeiture sites.

Reclamation Fees

A one-time nonrefundable reclamation fee, based on the total acreage of the permit, is assessed with the issuance of surface coal permits and coal refuse reprocessing permits. Between Aug. 1, 1981, and Aug. 6, 1993, this fee was \$50 per acre. Since Aug. 7, 1993, this reclamation fee has been \$100 per acre. The fee is not collected for acres that are repermited or rebonded, or for areas where the reclamation fee was previously collected. The reclamation fee is not collected for permit acres that are part of the department's financial guarantees reining program.

The reclamation fee is deposited in the department's Surface Mining Conservation and Reclamation Fund. The designated use for this fee is as a supplement to forfeited bonds. Proceeds from the reclamation fee are available for reclaiming mining operations that have defaulted on their obligation to reclaim. However, unlike forfeited bonds, which are restricted to specific sites, reclamation fee income may be used to reclaim primacy permit sites other than those for which the fees were collected.

¹ This information is extracted from a Feb. 27, 1991 letter sent to Harry M. Snyder, Director of OSM, by Karl K. Sheaffer, the Director of DER's Office of Environment Energy Management.

Objectives and Approach

In a process commonly described as achieving primacy, Pennsylvania assumed responsibility for implementation of the federal Surface Mining Control and Reclamation Act on July 31, 1982. This responsibility includes regulation and enforcement of all coal mining activity in the state. This study deals with the status of the bond forfeiture reclamation program for surface coal mining activities conducted under primacy. Surface coal mining activities include surface coal operations, coal preparation plants, coal refuse reprocessing, coal refuse disposal and the surface activities associated with underground mines. The evaluation includes the historical record of primacy permit forfeitures, bond and reclamation fee collection, completed forfeiture reclamation, as well as the current status of the program and outstanding land reclamation. The study covers the period through the end of November 1999. Another aspect of the study is a projection of future permit forfeitures and reclamation costs.

The study deals only with land reclamation that has not yet been completed. The bonding program is also intended to cover water pollution. However, the prevention of water pollution could extend for much longer periods of time; consequently, a different type of comprehensive analysis is needed. This work is currently being done, and the results will be reported separately.

The study includes all permits issued for surface coal mining activities after July 31, 1982. The results of the analysis are reported for each of the five surface mining activity permit categories: surface coal, coal refuse reprocessing, coal preparation plant, coal refuse disposal and surface areas associated with underground mining.

Informational records on permit type, size, location, mining status and date of issuance were obtained primarily from the department's database, currently known as eFACTS. Previous versions of this database were FIX (Foundation for Information Exchange) and its predecessor LUMIS (Land Use Management Information System), which was decommissioned in September 1999. The number of acres requiring reclamation for each forfeited site, as determined by the appropriate District Mining Office, also was obtained from these databases. Bonding information, including bond amounts, bond status, third party reclamation and date of forfeiture and collection was obtained from the database maintained by the Bureau of Mining and Reclamation. Information on the size, date and cost of reclamation projects completed by the department's Bureau of Abandoned Mine Reclamation (BAMR) was obtained from the BAMR bond forfeiture database. The permit and bond collection information also available in the BAMR database records was cross-checked with the LUMIS/FIX and Bureau of Mining and Reclamation's bond database records.

In addition to documenting the historical record and current status of primacy bond forfeitures and their completed reclamation, another objective of this study was to determine the costs to reclaim forfeited primacy sites that have not yet been evaluated by BAMR. To accomplish this, it was necessary to document the number of acres still requiring reclamation for each site and to develop reasonable estimates of the cost per acre to reclaim these sites. A statistical cost analysis was conducted of all primacy reclamation projects completed by BAMR. Original bond calculations for the removal of coal facility structures also were incorporated into reclamation

estimates. These results were used to determine the anticipated costs necessary to reclaim forfeited sites.

These average unit reclamation costs also were used with projections of future permitted acres and possible forfeitures, forfeited bond and reclamation fee collection, and the proportion of reclamation to be completed with bonding program resources. The objective was to forecast the feasibility of the state's alternative bonding program to reclaim mine sites that are forfeited during the next four years.

Summary and Conclusions

Introduction

The information presented in this report reflects the results of the detailed evaluation of specific elements of Pennsylvania's bonding program. The elements of the program evaluated are the alternative bonding program for land reclamation associated with surface coal mining operations and the full-cost bonding programs for coal refuse disposal operations and surface activities associated with deep mines. This report does not address the costs of measures required to prevent water pollution. The costs of measures to prevent water pollution by post mining discharges are the subject of a separate evaluation, and will be reported on separately.

The purpose of this evaluation was to answer two key questions:

- *What is the current status of the bonding program?*
- *What will the status of the bonding program be in the future, assuming no changes are made?*

Alternative Bonding System – Surface Mining Activities

With regard to the current status of the alternative bonding system, the analysis has identified a deficit. This deficit applies to land reclamation that has not yet been completed for the sites covered by the program. The deficit is characterized by two amounts. The first, in the amount of **\$3,840,776**, represents the difference between the total of actual and estimated costs of all outstanding land reclamation and the revenues into the bond fund designated to perform land reclamation.

The second amount takes into consideration expenditures of reclamation fees on pre-primacy sites. These expenditures are authorized by the department's regulations to supplement expenditures on forfeited sites. The regulations stipulate that priority must be given to primacy sites. During the period in the early 1980s when there were no primacy obligations (the first primacy forfeiture occurred in 1985), the department spent \$6,608,000 in reclamation fees on pre-primacy forfeiture obligations. In the analysis of the adequacy of revenues into the alternative bonding system, these funds are shown as credits. However, since they have already been spent, these funds are not available to be applied to the land reclamation that remains to be done. Consequently, the funds needed by the department to cover current land reclamation in the alternative bonding system total **\$10,448,776**.

The sum of \$10,448,776 represents the anticipated cost of completing all outstanding land reclamation covered by the alternative bonding system. However, as discussed in the following section, *Primacy Forfeitures from 1982 to Present*, the department has historically had to complete reclamation on only a portion of forfeited sites. The Bureau of Abandoned Mine Reclamation periodically reviews the status of individual sites to determine the likelihood of land

reclamation being assumed by other parties and currently believes that nine unreclaimed sites on which the bonds have been collected are likely candidates for repermitting. The estimated cost of completing the outstanding land reclamation associated with these sites is \$3,936,650. If all of these sites were repermitted and the previous reclamation obligations are fully transferred to the new remining operator, the outstanding land reclamation costs to the alternative bonding system would be reduced to \$6,512,126. Similarly, the Bureau of Mining and Reclamation has estimated that if sites on which bonds have not yet been collected are repermitted at the same rate as for sites with collected funds, the cost to complete the outstanding land reclamation would be reduced by an additional \$964,077. As a result, the outstanding land reclamation costs to the alternative bonding system would be reduced to **\$5,548,049**.

The identified deficit warrants additional comment. It is important to note that the deficit does not fully reflect the historical ability of the fund to maintain balance between primacy forfeiture costs and the income to deal with them. First, since 1983 the fund has foregone nearly \$2.3 million in revenue as a result of the department's "rec-in-lieu-of" program. Under this program, the department can negotiate for an operator to perform reclamation in lieu of paying an assessed fine or civil penalty. This program has undoubtedly provided more in reclamation value than the revenue foregone and appropriately directed the resources needed to address many health, safety and high-priority environmental problems. However, these substantial benefits are not necessarily reflected in the performance of the fund, because no effort was made to focus only on primacy forfeited sites. Second, other resources available to the fund, such as interest income, historically have been applied to higher-priority, non-primacy sites. The result of applying these additional resources to primacy sites would be a significantly reduced deficit. (Details of the resources available to the fund are presented in a detail section of this report: *Repositories for Bond Program Forfeiture Proceeds*, on page 32).

Statistics related to the alternative bonding system are summarized in Table 3.

Table 3
Important Statistics – Alternative Bonding System

Item	Amount
Revenues less outstanding land reclamation costs	(\$3,840,776)
Reclamation fees applied to pre-primacy sites	(\$6,608,000)
Current land reclamation costs	(\$10,448,776)
Reclamation costs on sites likely to be repermitted (collected bonds)	\$3,873,420
Reclamation costs on sites likely to be repermitted (uncollected bonds)	\$964,077
Likely land reclamation costs	(\$5,548,049)
Projected annual accrual of future land reclamation costs - no changes to alternative bonding system	(\$1,254,295)

With regard to the future performance of the program, assuming no changes are made, the analysis has identified a potential annual deficit of approximately **\$1.25 million**. This result is based on evaluating projected forfeitures for the next four years. Assumptions are that there would be no change in the way available funds are applied and that no action would be taken to increase revenues into the bond fund.

Full-Cost Bonding System – Coal Refuse Disposal

The evaluation of the full-cost bonding program for coal refuse disposal demonstrates a deficit with regard to current obligations. As further discussed in the detail section, *Current Status of Primacy Forfeiture Reclamation Program*, this deficit is **\$4,534,186**.

The ability of the coal refuse disposal program to deal with future obligations was analyzed. The primary assumption underlying this analysis is that there would be no change in the status quo. On this basis, the projected annual deficit for coal refuse disposal forfeitures is **\$632,704**.

Full-Cost Bonding System - Underground Mining

The evaluation of the full-cost bonding program for surface activities related to underground mining demonstrates a deficit with regard to current obligations. As further discussed in the detail section, *Current Status of Primacy Forfeiture Reclamation Program*, on page 24, this deficit is approximately **\$2.5 million**.

Similarly, the ability of the program to deal with future obligations was analyzed. The primary assumption underlying this analysis is that there would be no change in the status quo. The projected annual deficits for anthracite and bituminous deep mining forfeitures are **\$13,973** and **\$622,783** respectively.

General Conclusions

- There is a current deficit in the alternative bonding system associated with land reclamation costs. This deficit has resulted from the activities covered by the alternative bonding system -- surface coal mining, coal refuse reprocessing and coal preparation plants. The bonding requirements for surface coal mining have been adequate in providing sufficient revenue to deal with land reclamation costs for this category. Both the historical analysis and projections for the future have resulted in surpluses for this category.
- The surpluses that have been recorded for surface coal mining include consideration of land reclamation only and exclude costs associated with the prevention of water pollution. Estimates on the costs associated with the prevention of water pollution are under development.
- The current and projected deficits for the alternative bonding system are the result of deficits for coal refuse reprocessing and coal preparation plant activities. (As for surface coal mining, these results do not include any costs associated with the prevention of water pollution). The overall deficit is the result of the disproportionate demands placed on the alternative bonding system by these two categories of surface coal mining activities.

- The deficits reported for the full-cost bonding programs for coal refuse disposal operations and surface activities related to underground mining are an indication that bonding guidelines for these two programs need to be adjusted.

Future Actions

- As a result of this analysis, the department has decided to adopt a full-cost bonding system for coal mining activities currently covered by the alternative bonding system.
- As discussed earlier, the alternative bonding system has foregone income from penalties through the “rec-in-lieu-of” program. As a result of this analysis, the department has instituted a policy that limits project eligibility for the “rec-in-lieu-of” program to primacy sites.
- Once a full-cost bonding system is implemented, the accrual of projected future deficits will be eliminated and the current deficits (excluding costs associated with water treatment) will be stabilized.
- For the future, the department intends to apply available funds from interest, licenses, fees, fines and penalties to the current deficit for land reclamation in the alternative bonding system. Assuming that revenues into the alternative bonding system remain at approximately the same level, the department should be able to maintain a minimum rate of expenditure of \$1 million per year. At this level, a deficit of \$5.5 million (assuming the anticipated repermittings occur) could be eliminated in less than six years.
- The department intends to make adjustments to these estimates annually in conjunction with assessments of the bonding program.
- The department will use the analysis in this report to make appropriate adjustments to the full-cost bonding programs for coal refuse disposal operations and surface activities related to underground mines.

Primacy Forfeitures from 1982 to Present

Overview - Alternative Bonding System

The activities covered by the alternative bonding system are surface coal mining, coal refuse reprocessing and coal preparation plants. For the period under review, these three categories included a total of 3,502 permits that had to be evaluated. These permits covered a total area of approximately 612,891 acres.

The first forfeiture of a primacy surface mining permit occurred in 1985. To date, a total of 348 permits (nearly 10%) have been forfeited. The total area associated with these forfeitures is 63,197 acres, also about 10% of all permitted primacy surface mining acres. Information on the permitting and forfeiture history of primacy permits is summarized in Table 4.

Table 4
Summary of Primacy Surface Mining Permits Issued and Subsequent Forfeitures

Activity	Permits			Acreage		
	Number	Forfeited	% Forfeited	Total	Forfeited	% Forfeited
Surface Coal	3,124	290	9.3%	571,980	59,379	10.4%
Coal Refuse Reprocessing	253	38	15.0%	36,436	2,837	7.8%
Coal Preparation Plant	125	19	15.2%	4,475	981	21.9%
All Primacy Surface Mining Permits	3,502	347	9.9%	612,891	63,197	10.3%

Table 5 presents details on the land reclamation associated with forfeited surface coal mining sites. Of the forfeited areas, approximately 7,616 acres required reclamation. Historically, resources from the alternative bonding system have been used to reclaim approximately 52% of the obligations, while other parties have reclaimed the remaining 48%. A significant portion of the reclamation, 1,806 acres, or 24%, has been accomplished through consent orders and agreements. Sureties have assumed responsibility for 652 acres, or about 8% of the sites. Approximately 837 acres, or 11%, were reclaimed through repermitting or permit transfers, and 288 acres, or 4%, of the surface coal mining forfeitures were rescinded.

Table 5
Reclamation Status of Forfeited Primacy Surface Mining Permits Expressed
As Acres Needing Reclamation

	Surface Coal	Coal Refuse Reprocessing	Coal Preparation Plant	All Primacy Surface Mining Permits
	Acres			
CO&A	1,627	61	118	1,806
Surety	650	2	-	652
Bankrupt Surety	57	11	-	68
Repermitted/Transferred/ Remining	742	18	77	837
Forfeiture Rescinded	288	-	-	288
<i>Alternative Bonding System Reclamation</i>	<i>3,018</i>	<i>533</i>	<i>414</i>	<i>3,965</i>
Total	6,382	625	609	7,616

A land reclamation summary, evaluated from the perspective of forfeited permits, is presented in Table 6. Since 1985, the department has been successful in arranging for others to perform necessary land reclamation on more than half of the forfeited primacy surface mining permits. As shown in Table 5, the total acreage associated with remaining land reclamation needs is approximately 3,965 acres.

Table 6
Reclamation Status of All Forfeited Primacy Surface Mining Permits

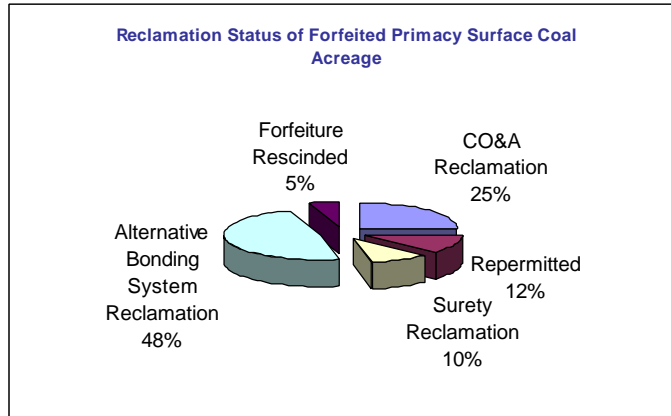
	Surface Coal	Coal Refuse Reprocessing	Coal Preparation Plant	All Primacy Surface Mining Permits
	Number Forfeited			
CO&A	61	2	3	66
Surety	36	3	-	39
Bankrupt Surety	5	1	-	6
Repermitted/Transferred/ Remining	31	3	3	37
Forfeiture Rescinded	18	-	-	18
<i>Alternative Bonding System Reclamation</i>	<i>139</i>	<i>29</i>	<i>13</i>	<i>181</i>
Total	290	38	19	347

The following sections present detailed information on the forfeiture history of each of the surface coal mining activities.

Surface Coal Permits

Since primacy, a total area of approximately 571,980 acres has been permitted in conjunction with 3,124 primacy surface coal permits. Following the first primacy surface coal forfeiture in 1985, 290, or about 9%, of these permits have been forfeited. The total surface coal area forfeited is 59,379 acres, or about 10% of all primacy surface coal acres. On these forfeiture sites, approximately 6,382 acres required reclamation.

Historically, parties other than the department have reclaimed 47% of the affected acres needing reclamation. About 25% of these sites have been reclaimed

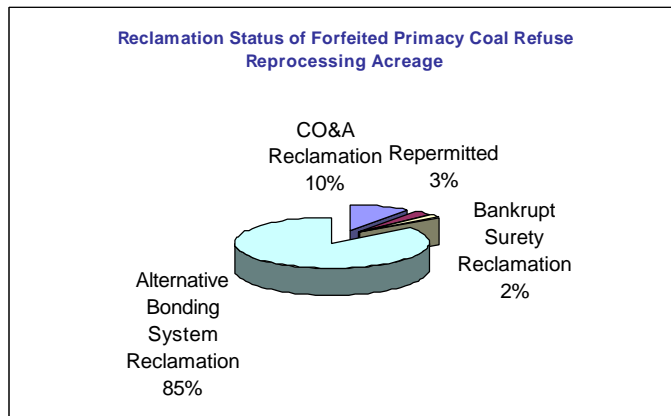


through consent orders and agreements; surety reclamation has reclaimed about 10%; repermitting or permit transferal has reclaimed 12%; and 5% of the surface coal forfeitures have been rescinded. Since 1985, 139 forfeited primacy surface coal permits have been left to be reclaimed through the alternative bonding system. The land reclamation area associated with these permits is approximately 3,018 acres (see the summary in Table 5).

Coal Refuse Reprocessing Permits

For the same period, approximately 36,436 acres have been permitted in conjunction with 253 primacy coal refuse reprocessing permits. Since the first primacy coal refuse reprocessing forfeiture in 1987, 38 of the permits (approximately 15%) have been forfeited. The total coal refuse reprocessing acreage forfeited is 2,837, or about 8% of all primacy coal refuse reprocessing acres. On these forfeiture sites, approximately 625 acres required reclamation (Table 5). Historically,

parties other than the alternative bonding system have reclaimed only about 15% of the affected acres needing reclamation. Consent order and agreement reclamation has reclaimed about 10% of these sites,



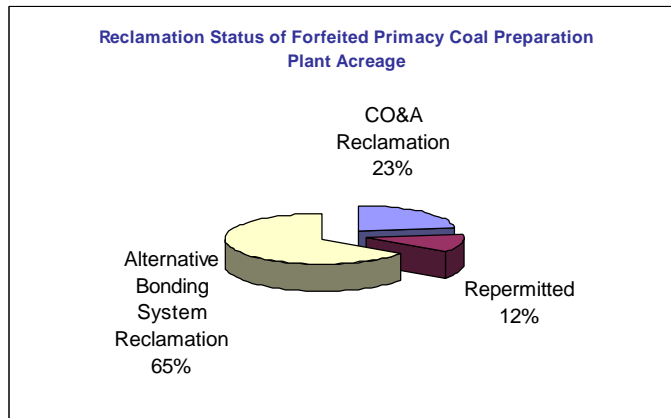
whereas surety reclamation has reclaimed less than 0.3%. Bankrupt surety sites represent 2%, and repermitting or permit transferal has reclaimed 3%. Since 1987, 29 forfeited primacy coal

refuse reprocessing permits have been left for the alternative bonding system to reclaim. The area associated with these permits is approximately 533 acres.

Coal Preparation Plant Permits

There have been approximately 4,475 acres permitted in association with 125 coal preparation plant permits. Since the first coal preparation plant forfeiture in 1989, 19 of these permits (15%) have been forfeited.

The total coal preparation plant acreage forfeited is 981, or about 22% of all coal preparation plant acres. On these forfeiture sites, approximately 609 acres required reclamation.



Historically, parties other than the alternative bonding system have reclaimed approximately 35% of the affected acres needing reclamation. About 23% of the sites have been reclaimed under arrangements covered by consent orders and agreements, and another 12% have been reclaimed through repermitting or permit transferal. There has been no surety reclamation. Since 1989, 13 forfeited primacy coal preparation plant permits with an approximate area of 414 acres have been left for reclamation through the alternative bonding system (see Table 5).

Full-Cost Bonding System - Coal Refuse Disposal Permits

Table 7 provides a summary of the status of coal refuse disposal permits. Ninety-nine primacy coal refuse disposal sites with an associated area of approximately 12,957 acres have been

**Table 7
Summary of Primacy Coal Refuse Disposal Permits
Issued and Subsequent Forfeitures**

	Total	Forfeited	
		Number	%
Permits (number)	99	17	17.2%
Area (acres)	12,957	1,361	10.5%

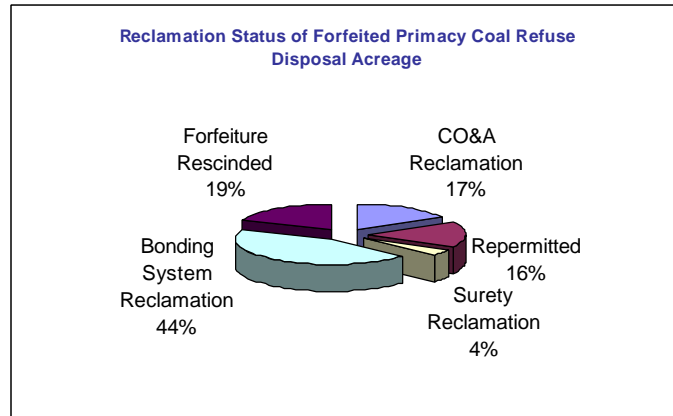
permitted since primacy. Since the first primacy surface coal refuse disposal forfeiture in 1989, 17 (17%) of the permits have been forfeited. The total coal refuse disposal coal acreage forfeited is 1,361, or about 11% of all primacy coal refuse disposal acres. On these forfeiture sites,

approximately 449 acres required reclamation (see Table 8). Historically, parties other than the bonding system have reclaimed about 37% of the affected acres needing reclamation.

Table 8
Reclamation Status of Forfeited Coal Refuse Disposal Permits

	Permits	Acres
CO&A	5	78
Surety	1	20
Bankrupt Surety	-	-
Repermitted/Transferred/Remining	2	72
Forfeiture Rescinded	2	85
Alternative Bonding System Reclamation	7	194
Total	17	449

Consent order and agreement reclamation has reclaimed about 17% of these sites; surety reclamation has reclaimed about 4%; repermitting or permit transferal has reclaimed 16%; and 19% of the coal refuse disposal forfeitures have been rescinded. Since 1989, seven forfeited primacy coal refuse disposal



permits with an approximate area of 194 acres have been left to be reclaimed with bonds posted for the individual sites (see Table 8).

Full-Cost Bonding Program - Surface Effects of Underground Mining

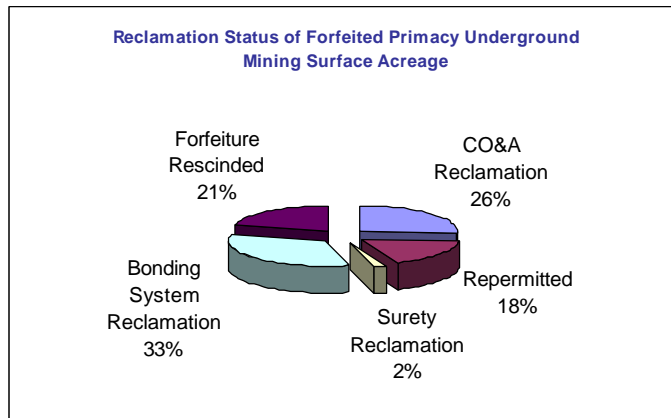
Approximately 51,585 surface acres have been permitted in conjunction with 298 primacy underground mining permits. Since the first primacy underground mine forfeiture in 1987, 27 of the permits (about 9%) have been forfeited (see Table 9). The total underground mine surface area forfeited is 1,594 acres, or about 3% of all underground mining surface acres. On these forfeiture sites, approximately 417 acres required reclamation (see Table 10). Historically, parties other than the bonding system have reclaimed approximately 46% of the affected acres

Table 9
Summary of Primacy Underground Mining Permits Issued and Subsequent Forfeitures

Activity	Permits			Acreage		
	Number	Forfeited	% Forfeited	Total	Forfeited	% Forfeited
Anthracite Underground	126	8	6%	1,299	309	24%
Bituminous Underground	172	19	11%	50,286	1,285	3%
All Primacy Underground Mining Permits	298	27	9%	51,585	1,594	3%

needing reclamation. Consent order and agreement reclamation has reclaimed about 26% of these sites; repermitting or permit transferal has reclaimed 18%; and surety reclamation has reclaimed 2% of the surface acreage.

The department has rescinded forfeitures for 21% of the underground mining surface acres. Since 1987, 13 forfeited primacy underground mining permits, representing 33% of the total primacy



underground mining surface acreage needing reclamation, have been left to be reclaimed with bonds posted for the individual sites.

Table 10
Reclamation Status of Forfeited Primacy Underground Mining Permits Expressed As Acres Needing Reclamation

	Anthracite Underground	Bituminous Underground	All Primacy Underground Mining Permits
	Acres		
CO&A	0	107	107
Surety	0	9	9
Repermitted/Transferred/Remining	11	66	77
Forfeiture Rescinded	0	86	86
Full-Cost Bonding Program Reclamation	11	127	138
Total	22	395	417

Average Costs for Reclamation

As part of this evaluation, estimates were developed of the average costs for reclamation of forfeited primacy mine sites completed by the department's Bureau of Abandoned Mine Reclamation (BAMR). These estimates were needed to determine the expected costs for reclamation of sites that have not yet been studied by BAMR and to calculate reclamation costs associated with possible future forfeitures. BAMR currently has completed reclamation on a total of 96 forfeited primacy permits. A summary of the categories of surface and underground coal mining activities and the number of sites completed in each category is presented in Table 11.

Table 11
Number of Sites Reclaimed by BAMR

Activity	Sites Reclaimed
Surface Coal	81
Coal Refuse Reprocessing	9
Coal Preparation Plants	3
Coal Refuse Disposal	0
Underground Mining	3
Total	96

The approach used to determine average costs was not the same for each of the permit categories. The selected approach for a particular category was dependent on the site information available and the number of sites already reclaimed by BAMR for that category. If a category had a reasonable number of reclamation projects completed by BAMR, the approach was to calculate the average of the costs of all the completed projects. This approach was used for surface coal sites and coal refuse reprocessing sites. BAMR has reclaimed only three forfeited coal preparation plant sites, but land reclamation development estimates and assessments of demolition needs are available for the remaining 10 unreclaimed sites. This information was used to determine site-specific reclamation costs for each of the 10 sites. For this category, future projections were based on an average cost derived from the combination of completed projects and development estimates. BAMR has not completed any reclamation projects in the coal refuse disposal category, thus precluding estimates that are based on actual experience. Anticipated typical costs for this category were based on an identification of unit operations required for reclamation on these refuse disposal sites and the average (typical) costs for these work items. Typical costs were derived from completed projects in other permit categories with comparable reclamation methods and materials.

The following discussions elaborate on each of these approaches and describe cost adjustments made for inflation and other factors used to develop an average or typical unit cost per acre for land reclamation. In this study, the overall approach for estimating costs of forfeited sites not yet evaluated by BAMR, as well as determining estimated costs of future forfeitures, is to apply a unit cost per acre toward the known or projected number of acres requiring reclamation.

Surface Coal Permits

BAMR has managed projects for the reclamation of 81 forfeited primacy surface coal sites, starting with the first forfeiture in this category in 1988. Forty-five of these forfeited sites were primacy permits, and 36 of these sites were pre-primacy operations re-permitted as primacy permits. Approximately 1,829 total surface coal permit acres were reclaimed, with an average reclamation of 24 acres per forfeited site.

The 81 projects include a few that are not typical land reclamation projects. One of the projects was a low-cost three-acre project completed with the participation of the Pennsylvania Game Commission. Two projects dealt only with water supplies, and another four were high-cost projects that included extraordinary items, such as expensive water treatment, roadside drains and pipelines and even construction of a parking lot area. These projects went well beyond the usual range of land reclamation activities and, consequently, were not included in the analysis. Costs for the remaining 74 land-only reclamation projects that were completed by BAMR ranged from \$2,618 to \$1,401,168 per site. The contracted unit land reclamation costs ranged from \$1,309 to \$11,961 per acre, with an overall average of \$5,018 per acre.

For this study, an average cost per acre was developed for use in estimating future land reclamation costs. This average cost was based on individual BAMR land reclamation costs over the 1988-1999 period and adjusted for inflation rate changes. Inflation rate changes were obtained from the U.S. Bureau of Labor's Consumer Price Index. Unit costs per acre were adjusted from the unit costs on the contract award date into equivalent 1998 dollars.

For both primacy and re-permitted primacy forfeited surface coal permits, no overall increasing or decreasing trend in the variability of costs over time was evident. Trends were limited to minor cycles of increasing and decreasing costs over short sequences of four or five completed reclamation projects.

The inflation-adjusted unit costs for the land reclamation of 42 primacy surface coal permit sites ranged from \$1,768 to \$12,481, with an average cost per acre of \$5,426. The inflation-adjusted unit costs for the land reclamation of 32 re-permitted primacy surface coal permit sites ranged from \$1,512 to \$14,730, with an average cost per acre of \$5,848. The higher cost of reclamation for the older re-permitted forfeited sites may reflect the inheritance of pre-existing problems. The department believes that such problems have been eliminated in newer primacy permits through improved permitting practices. For this reason, more weight has been given to the \$5,426 average reclamation unit cost when considering newer forfeited primacy permits.

After averaging inflation-adjusted unit costs for 74 primacy and re-permitted primacy surface coal land reclamation projects completed by BAMR, it was determined that the cost per acre to be used in this study for estimating future reclamation costs of forfeited primacy surface coal sites is \$5,500 per acre.

There have been 139 forfeitures of primacy surface coal permits with associated land reclamation that has not been done by other parties. Approximately 58% of these sites have been reclaimed by BAMR. Considering this percentage and that the number of reclaimed surface coal

sites is greater than the number of sites remaining to be reclaimed, it is reasonable to use the adjusted average cost per acre of \$5,500 to estimate costs of future reclamation efforts.

Coal Refuse Reprocessing Permits

Nine forfeited primacy coal refuse reprocessing sites have been reclaimed by BAMR from 1990 through 1999. Cost information for reclamation is available on approximately 180 total acres. This total includes an 11-acre site left to be reclaimed by BAMR because of a bankrupt surety. The average reclamation per site was 20 acres. The reclaimed acreage on the sites ranged from nine to 54 acres. The reclamation costs per site ranged from \$68,371 to \$551,830.

In order to establish an average cost per acre to be applied to future reclamation estimates, the individual BAMR costs over the 1990-1999 period were adjusted for inflation rate changes. Inflation rate changes over time were obtained from the U.S. Bureau of Labor's Consumer Price Index. Unit costs per acre were adjusted from the unit costs on the contract award date into equivalent 1998 dollars.

The inflation-adjusted unit costs per acre for each of the nine completed BAMR reclamation contracts were then averaged. The adjusted costs per acre in 1998 dollars ranged from \$6,589 to \$17,907, with an average cost of \$11,022 per acre. There was no apparent trend in the variability of costs over time.

The \$11,000 average cost per acre used in this study for estimating future reclamation costs of forfeited primacy coal refuse reprocessing sites is based on the inflation-adjusted average cost of all BAMR projects completed for reclamation of primacy coal refuse reprocessing sites.

There have been 38 forfeitures of primacy coal refuse reprocessing permits, including nine that have been reclaimed by other parties. Approximately 31% of these sites have been reclaimed by BAMR. Considering the percentage of reclaimed coal refuse reprocessing sites to the number of sites remaining, it is reasonable to apply the adjusted average cost per acre of \$11,000 in estimating costs of future reclamation efforts.

Coal Preparation Plant Permits

There have been 13 forfeitures of primacy coal preparation plant permits. From 1990 through 1999, BAMR has reclaimed three coal preparation plant sites. The total reclamation area associated with these three projects was 50 acres, with reclamation acreage per site ranging from five to 27 acres. The reclamation costs ranged from \$128,552 to \$414,323 per site. After adjusting these costs for inflation using the U.S. Bureau of Labor's Consumer Price Index, the average cost of the three completed projects was \$20,904 per acre in 1998 dollars.

Although total costs are available for the three coal preparation plant sites reclaimed by BAMR, a breakdown of costs for land reclamation and structure demolition or removal was not recorded. Consequently, it was concluded that an historical average cost would not provide a reliable cost

estimate to apply toward the remaining 10 sites requiring reclamation by BAMR, nor would it provide a good estimate for the analysis of costs related to future forfeitures. As a result, more emphasis was placed on using the known conditions at each of the 10 unreclaimed sites. For six sites, current information was available on the specific requirements for land reclamation, related costs and the remaining structures requiring removal. Having developed detailed cost estimates for each site in this group, the average of land reclamation costs and the average amount of structures requiring removal were determined and applied to the development of average costs for the remaining four unreclaimed sites where there is less current information known. The details of each of these analyses are discussed below.

Of the 10 sites still needing reclamation, BAMR has determined development estimate costs for two of the sites and provided detailed information on the current status of four other plant sites, along with preliminary cost estimates for land reclamation only. The preliminary unit costs per acre for land reclamation ranged from \$9,172 to \$16,234 per acre. No preliminary estimate of the cost of removing abandoned structures was considered by BAMR.

To obtain an estimate of the additional costs associated with the removal or demolition of abandoned plant facility structures, the original detailed bond calculation sheets were obtained for each site. The bonded amount for structures was then compared to current conditions at the forfeited site, and adjustments were made to the original bond estimate, depending on the structures remaining today.

For the six unreclaimed coal preparation sites where the bonds have been collected, the total reclamation estimate is based on BAMR's site-specific engineering estimates for costs of land reclamation, and the site-specific costs for removal of current structures are based on original bond calculations.

Detailed information is not readily available for four forfeited sites where bonds have not yet been collected. For these sites, cost estimates were based on average land reclamation costs and average adjustments to the original structure bond calculations were used. The average unit cost for land reclamation at the six sites with detailed information was approximately \$13,000 per acre. This average was applied to the acres indicated as requiring reclamation on the four sites with less detailed information.

The average abandoned status of structures remaining on forfeited coal preparation sites is approximately 30% removed, 70% still remaining. These averages were applied to the original bond calculations for the structures permitted on the four sites lacking current information.

For four forfeited coal preparation sites where the current conditions are not available, the total reclamation cost is estimated by using a unit cost of \$13,000 per acre for land reclamation, combined with 70% of the original bond amount for the removal or demolition of facility structures.

Coal Refuse Disposal Permits

BAMR has not reclaimed any forfeited coal refuse disposal sites. However, a development estimate has been prepared for one site. It is estimated that the cost to reclaim the 113-acre site is \$3,500,000 – an average of approximately \$31,000 per acre. In discussions with BAMR, an estimate of \$20,000 per acre has been suggested for an average cost per acre for reclamation of coal refuse disposal sites. This average would only apply to sites not requiring special treatment for chemically or physically unstable refuse material, more than minimal regrading of slopes or more than minimal soil and clay lining coverage. If a site requires any of these more costly design considerations, an average unit cost per acre of \$30,000 is more reasonable.

The estimated minimal cost of \$20,000 per acre is partly based on a recent analysis of soil cover and clay lining costs that BAMR received as bids for other reclamation sites during the past two years. The average cost of the three lowest bids for 12-inch soil cover for five different recent contracts was \$11,653 per acre. The average cost of the three lowest bids for a six-inch impervious soil lining (clayey material) for three recent contracts was \$7,018 per acre. Combined together, these average bids approach \$20,000 per acre.

There are currently nine forfeited primacy coal refuse disposal sites requiring reclamation by the alternative bonding system. Some of these will require only minimal reclamation efforts; some are known to have special design and handling problems.

The \$20,000 per acre cost used in this study for estimating future reclamation costs of forfeited primacy coal refuse disposal sites is a minimum estimate, and actual costs will most likely vary on a case by case basis.

Current Status of Primacy Forfeiture Reclamation Program

Alternative Bonding System - Surface Mining Activities

BAMR has reclaimed approximately 1,905 acres of forfeited surface mining permit sites at a cost of \$13,592,193. The total of forfeited areas remaining to be reclaimed is currently 2,060 acres. BAMR has developed cost estimates based on engineering designs for the reclamation of 421 acres of the remaining total. The cost estimate for this category is \$6,984,045. The Bureau of Mining and Reclamation has estimated that it will cost an additional \$14,195,902 to reclaim the remaining 1,639 acres needing reclamation. This estimate is based on average costs of \$5,500 per reclamation acre for surface coal mine sites and \$11,000 per reclamation acre for coal refuse reprocessing sites. Coal preparation plant estimates are developed from site-specific evaluations. The costs for structure removal are based on original bond calculations for structure removal and approximately \$13,000 per acre for land reclamation. The results are summarized in Table 12.

Table 12
Costs for DEP Reclamation of Forfeited Primacy Surface Mining Activity Permits

Reclamation Category	Reclamation Acres	Cost
Reclamation completed by BAMR	1,905	\$13,592,193
BAMR estimate to reclaim	421	\$6,984,045
BMR estimate to reclaim	1,639	\$14,195,902
<i>Primacy Surface Mining Forfeiture Reclamation</i>	3,965	\$34,772,140

The estimated total cost of all forfeited primacy surface mine reclamation completed and to be completed by the alternative bonding system is \$34,772,140.

Revenue from several sources is available to cover these costs. Since 1982, \$13,394,675 in revenue has been collected from forfeited bonds on primacy surface mining sites. Excess funds from a site-specific bond remaining after reclamation has been completed are available to supplement obligations on other sites. This analysis assumes that such transfers will be made. However, because of reported acid mine drainage (AMD) discharges, a total of \$879,538 in such site-specific bonds is restricted even though the land reclamation on these sites has been completed. The reclamation fee on primacy operations generated total supplementary income of \$13,806,464. Further, the department has committed \$700,000 of the interest income earned in the bonding program account for work on these forfeited primacy surface mine sites during the current fiscal year. Finally, the total of uncollected forfeited bonds is \$4,614,518. After making an allowance for a portion of bonds that the department historically has not been able to collect, it is assumed that \$3,909,763 will be ultimately collected.

After applying the resources discussed above to all surface mining reclamation costs that have developed on primacy operations, there is a deficit of \$3,840,776. This information is

summarized in Table 13. Details relating to individual activities of the surface mining program are discussed below.

Table 13
Current Deficit to Complete DEP Reclamation of All Forfeited Surface Mining Permits – Alternative Bonding System

Total cost to reclaim forfeited primacy surface mining sites	(\$34,772,140)
Revenue from collected forfeited bonds	\$13,394,675
Site-specific bonds on 15 reclaimed sites with post-reclamation AMD	(\$879,538)
Revenue from reclamation fees	\$13,806,464
Income from licenses, fees, fines, penalties and interest available to be applied in the current fiscal year	\$700,000
Estimated revenue from uncollected forfeited bonds	\$3,909,763
<i>Current Deficit to Complete All Surface Mine Site Reclamation</i>	<i>(\$3,840,776)</i>

The calculated current deficit of approximately \$3.9 million represents the difference between the cost of reclaiming forfeited sites and the designated assets from the alternative bonding program fund that have been applied to reclaim the forfeited sites. However, the deficit does not fully reflect the historical ability of the fund to maintain balance between primacy forfeiture reclamation costs and the income to deal with them. Other resources available to the fund have, by historical department policy, been applied to higher-priority, non-primacy land reclamation. The result of applying these additional resources to the reclamation of primacy forfeiture sites would be a significantly reduced deficit. (Details of the resources available to the fund are presented in the section titled *Repositories for Bond Program Funds* on page 32).

Surface Coal Permits

BAMR has reclaimed approximately 1,686 acres of forfeited primacy surface coal permit sites at a cost of \$10,509,368. There are currently 1,332 surface coal acres that need to be reclaimed. BAMR engineering estimates project a cost of \$845,100 to reclaim 79 acres of this obligation. The Bureau of Mining and Reclamation has estimated that an additional \$6,888,750 is needed to reclaim the remaining 1,253 surface coal acres. This estimate is based on an average reclamation cost of \$5,500 per acre, as determined from analysis of the 81 forfeited primacy surface coal sites that BAMR has reclaimed since 1988. The \$5,500 amount represents the typical average cost adjusted for inflation.

Table 14
Costs for DEP Reclamation of Forfeited Primacy Surface Coal Permits

Category	Reclamation Acres	Cost
Reclamation completed by BAMR	1,686	\$10,509,368
BAMR estimate to reclaim	79	\$845,100
BMR estimate to reclaim	1,253	\$6,888,750
<i>Primacy Surface Coal Forfeiture Reclamation</i>	<i>3,018</i>	<i>\$18,243,218</i>

The estimated total cost of all forfeited primacy surface coal reclamation completed and to be completed by the alternative bonding system is \$18,243,218. Since 1986, the department has collected \$11,490,556 in bonds from forfeited surface coal permits. Of this total, \$879,538 is associated with 15 sites on which the land reclamation has been completed but for which BAMR records reflect a post-reclamation AMD discharge. (The current status of the reported AMD discharges on these sites is under evaluation). Since 1982, the department has also collected approximately \$12,840,011 in reclamation fees from surface coal permits. Uncollected forfeited surface coal bonds are currently valued at \$1,639,605. Historically, the department has been able to collect approximately 92% of all forfeited bonds from primacy surface coal forfeitures. (See the discussion on *Collection of Forfeited Bonds* and the summary of collection rates in Table 2 on page 5). Assuming that 92% of all uncollected forfeited bonds are collected and applied, along with the collected bonds and available reclamation fees, the total land reclamation cost of all forfeited primacy surface coal permits has a current surplus of \$6,716,248. The surplus does not consider the costs associated with preventing water pollution on these sites. Those costs are the subject of a separate evaluation.

Table 15
Current Deficit to Complete DEP Reclamation of Forfeited Primacy Surface Coal Permits

Total cost to reclaim forfeited primacy surface coal permit sites	(\$18,243,218)
Total amount of collected bonds	\$11,490,556
Site-specific bonds on 15 reclaimed sites with post-reclamation AMD	(\$879,538)
Total amount of reclamation fees collected	\$12,840,011
92% of all bonds to be collected	\$1,508,437
<i>Current Surplus after Completing All Surface Coal Permit Land Reclamation</i>	<i>\$6,716,248</i>

Coal Refuse Reprocessing Permits

BAMR has reclaimed approximately 169 acres of forfeited primacy coal refuse reprocessing sites at a cost of \$1,846,971. There are currently 364 coal refuse reprocessing acres remaining to be reclaimed. BAMR engineering estimates project a cost of \$4,595,800 to reclaim an additional 243 acres. The Bureau of Mining and Reclamation has estimated that it will cost an additional \$1,329,350 to reclaim the remaining 121 coal refuse reprocessing acres. This estimate is based on an average reclamation cost of \$11,000 per acre, determined from analysis of the nine

forfeited primacy coal refuse reprocessing sites that BAMR has reclaimed since 1990. The \$11,000 amount represents the average cost per acre adjusted for inflation over time.

Table 16
Costs for DEP Reclamation of Forfeited Primacy Coal Refuse Reprocessing Permits

Category	Reclamation Acres	Cost
Reclamation completed by BAMR	169	\$1,846,971
BAMR estimate to reclaim	243	\$4,595,800
BMR estimate to reclaim	121	\$1,329,350
<i>Primacy Coal Refuse Reprocessing Forfeiture Reclamation</i>	533	\$7,772,121

The estimated total cost of all forfeited primacy coal refuse reprocessing site reclamation completed and to be completed by the alternative bonding system is approximately \$7,772,121. Since 1987, the department has collected \$806,944 in bonds from forfeited coal refuse reprocessing permits, and since 1982 has also collected approximately \$966,453 in reclamation fees from coal refuse reprocessing permits. Uncollected forfeited coal refuse reprocessing bonds are currently valued at \$125,855. Historically, the department has been able to collect approximately 97% of all forfeited bonds from primacy coal refuse reprocessing permit forfeitures (see Table 2 on page 5). Assuming that 97% of all uncollected forfeited bonds are collected and applied, along with the collected bonds and available reclamation fees, the total reclamation cost of all forfeited primacy coal refuse reprocessing permits has a current deficit of \$5,876,644.

Table 17
Current Deficit to Complete DEP Reclamation of Forfeited Primacy Coal Refuse Reprocessing Permits

Total cost to reclaim forfeited primacy coal refuse reprocessing permit sites	(\$7,772,121)
Total amount of collected bonds	\$806,944
Total amount of reclamation fees collected	\$966,453
97% of all bonds to be collected	\$122,079
<i>Current Deficit to Complete All Coal Refuse Reprocessing Site Reclamation</i>	<i>(\$5,876,644)</i>

Coal Preparation Plant Permits

BAMR has reclaimed approximately 50 acres of forfeited primacy coal preparation plant sites at a cost of \$1,229,085. There are currently 364 coal preparation plant acres that need to be reclaimed. BAMR engineering estimates project a cost of \$1,549,915 to reclaim an additional 99 acres. The Bureau of Mining and Reclamation has determined that it will cost an additional \$5,977,802 to reclaim the remaining 265 coal preparation plant acres. This estimate is based on

site specific evaluations of the original bond calculations for removal of coal facility structures and an average land reclamation cost of approximately \$13,000 per acre.

Table 18
Costs for DEP Reclamation of Forfeited Primacy Coal Preparation Plant Permits

Category	Reclamation Acres	Cost
Reclamation completed by BAMR	50	\$1,229,085
BAMR estimate to reclaim	99	\$1,549,915
BMR estimate to reclaim	265	\$5,977,802
<i>Primacy Coal Preparation Plant Forfeiture Reclamation</i>	<i>414</i>	<i>\$8,756,802</i>

The estimated total cost of reclamation at all forfeited coal preparation plant sites that has been completed by the alternative bonding system plus the reclamation remaining to be completed is approximately \$8,756,802. Since 1990, the department has collected \$1,097,175 in bonds from forfeited coal preparation plant permits. There are no reclamation fees collected from coal preparation plant permits.

Uncollected bonds associated with forfeited primacy coal preparation plants currently are valued at \$2,849,059. These uncollected funds are associated with only four coal preparation plant permits. The historical rate of collection of forfeited bonds from coal preparation plant forfeitures is 37%. However, this historical collection rate is a reflection of several anomalies and is not considered representative. One anomaly is that the historical collections are associated with small dollar amount forfeitures, while the uncollected forfeitures represent much higher dollar amounts. Second, the uncollected forfeitures are still under normal processing and are ultimately expected to be resolved through collection or other surety obligation. A surety company will routinely challenge a forfeiture action and, as an alternative to paying the bond, is very likely to enter into a reclamation agreement if the amount of the bond exceeds its expected reclamation cost. All four coal preparation plant forfeitures have been appealed. The department expects that all four of these forfeitures will ultimately be resolved either by full collection of the bonds or surety reclamation of the sites. Thus, the final collection rate should be close to 100%. However, final resolution may not be reached for a year or several years. Consequently, for the purpose of this analysis, the department has assumed a conservative collection rate of 80% (see Table 2 on page 5). Applying the anticipated proceeds along with the collected bonds, the total reclamation cost for all forfeited primacy coal preparation plant permits has a current deficit of \$5,380,380.

Table 19
Current Deficit to Complete DEP Reclamation of Forfeited Primacy Coal Preparation Plant Permits

Total cost to reclaim forfeited primacy coal preparation plant permit sites	(\$8,756,802)
Total amount of collected bonds	\$1,097,175
80% of all bonds to be collected	\$2,279,247
Current Deficit to Complete All Coal Preparation Plant Site Reclamation	(\$5,380,380)

Summary of Surface Mining Activities – Alternative Bonding System

A summary of the individual balances for each of the three surface coal mining activities in the alternative bonding system is presented in Table 20. As discussed at the beginning of this section, there is an estimated deficit of \$3,840,776.

Table 20
Summary of Remaining Reclamation Costs for the Alternative Bonding System

Surface Mining Activity	Surplus/(Deficit)
Surplus: Surface Coal Permit Site Reclamation	\$6,716,248
Deficit: Coal Refuse Reprocessing Site Reclamation	(\$5,876,644)
Deficit: Coal Preparation Plant Site Reclamation	(\$5,380,380)
Income from licenses, fees, fines, penalties and interest available to be applied in the current fiscal year	\$700,000
Total Deficit	(\$3,840,776)

Full-Cost Bonding System - Coal Refuse Disposal Permits

BAMR has not reclaimed any forfeited primacy coal refuse disposal sites. There are currently 194 coal refuse disposal acres that need to be reclaimed. BAMR engineering estimates project a cost of \$3,506,770 to reclaim 113 acres. The Bureau of Mining and Reclamation has estimated that it will cost an additional \$1,612,000 to reclaim the remaining 81 coal refuse disposal acres. This estimate is based on an average reclamation cost of \$20,000 per acre, as recommended by BAMR as an average reclamation cost for refuse disposal sites not requiring special treatment or costly design considerations.

Table 21
Costs for DEP Reclamation of Forfeited Primacy Coal Refuse Disposal Permits

Category	Reclamation Acres	Cost
Reclamation completed by BAMR	0	-
BAMR estimate to reclaim	113	\$3,506,770
BMR estimate to reclaim	81	\$1,612,000
<i>Primacy Coal Refuse Disposal Forfeiture Reclamation</i>	214	\$5,118,770

The estimated reclamation cost of all forfeited primacy coal refuse disposal sites to be reclaimed by the alternative bonding system is approximately \$5,118,770. Since 1990, the department has collected \$434,995 in forfeited bonds from coal refuse disposal permits. There are no reclamation fees collected from coal refuse disposal permits.

The total of uncollected forfeited coal refuse disposal bonds is currently \$164,384. Historically, the department has collected approximately 91% of all forfeited bonds from primacy coal refuse disposal permit forfeitures. Assuming that 91% of all uncollected forfeited bonds are collected and applied, along with the collected bonds, the total cost to reclaim all forfeited primacy coal refuse disposal sites has a current deficit of \$4,534,186.

Table 22
Current Deficit to Complete DEP Reclamation of Forfeited Primacy Coal Refuse Disposal Permits

Total cost to reclaim forfeited primacy coal refuse disposal permit sites	(\$5,118,770)
Total amount of collected bonds	\$434,995
91% of all bonds to be collected	149,589
<i>Current Deficit to Complete All Coal Refuse Disposal Site Reclamation</i>	<i>(\$4,534,186)</i>

Full-Cost Bonding System - Underground Mining Permits

The BAMR has reclaimed approximately 43 acres of forfeited primacy underground mining sites at a cost of \$774,958. There are currently 95 acres that still need to be reclaimed. Based on engineering estimates, BAMR projects that it will cost \$2,583,800 to reclaim these 95 acres. The total cost of all reclamation completed and to be completed is approximately \$3,358,758.

Table 23
Costs for DEP Reclamation of Forfeited Primacy Underground Mine Permits

Category	Reclamation Acres	Cost
Reclamation completed by BAMR	43	\$774,958
BAMR estimate to reclaim	95	\$2,583,800
<i>Primacy Underground Mining Forfeiture Reclamation</i>	<i>138</i>	<i>\$3,358,758</i>

The bonding rates for underground mines are based on the full cost to perform reclamation on a forfeited site. Consequently, there are no reclamation fees associated with underground mining permits. The department has collected \$760,148 from forfeited bonds, and \$134,010 in forfeited bonds remains to be collected. The department has been able to collect 100% of all previously forfeited primacy underground mining bonds. Assuming that all uncollected forfeited bonds are collected, the total cost to reclaim all forfeited primacy underground mining sites will have a current deficit of \$2,464,600.

Table 24
Current Deficit to Complete DEP Reclamation of Forfeited Primacy Underground Mine Permits

Total cost to reclaim forfeited primacy underground mining sites	(\$3,358,758)
Total amount of collected bonds	\$760,148
Total amount of bonds to be collected	\$134,010
<i>Current Deficit to Complete All Underground Mine Site Reclamation</i>	<i>(\$2,464,600)</i>

Repositories for Bond Program Funds

Proceeds from bond forfeitures and other income associated with Pennsylvania's alternative and full-cost bonding programs are deposited into one of three funds. These funds are the Surface Mining Conservation and Reclamation Fund, the Coal Refuse Disposal Control Fund and the Bituminous Mine Subsidence and Land Conservation Fund. In addition, proceeds from permit application fees for coal mining activities and fines and penalties levied on deep mines are deposited into the Clean Water Fund. The details on these funds that are relevant to Pennsylvania's coal mining bonding programs are discussed below.

The Surface Mining Conservation and Reclamation Fund

The Surface Mining Conservation and Reclamation Fund is established under PA SMCRA (52 P.S. §1396.18(a)). The primary purposes of the fund are to provide for the revegetation or reclamation of land affected by surface mining activities and for the restoration or replacement of water supplies affected by surface mining activities (52 P.S. §1396.18(a)).

The fund receives money from a variety of sources. The proceeds from bond forfeitures represent the most important source. All license, permit and reclamation fees collected under the alternative bonding program are also deposited into the fund. In addition, fines collected under Section 1396.3a, penalties collected under Section 1396.18e, civil penalties collected under Section 1396.18d, and cash deposits, securities and costs recovered from the Clean Streams Law as related to surface mining, are deposited into the fund (52 P.S. §1396.18(a)). However, funds from each of these sources are specifically earmarked for certain activities.

Money deposited into the fund from surface coal and coal refuse reprocessing permit and reclamation fees, and the interest accrued from these fees, can be used for the reclamation of any land and the restoration of its water supplies. These areas must have been affected by surface mining operations on sites where the department has forfeited bonds. These funds are a financial supplement to forfeited bonds deposited in the bond forfeiture fund (52 P.S. §1396.18(a); 25 *Pa. Code* §86.187(a)(1)).

Money deposited in the fund from the forfeiture of mining bonds can only be used for the reclamation of land and restoration of water supplies on the specific site that was affected by the surface mining operations where the liability was charged on the bond. If there are excess funds from these bonds, the department may use these funds to reclaim land and restore water supplies affected by any surface mining operations where bonds have been forfeited (25 *Pa. Code* §86.190(c)). However, moneys received from bond forfeitures need not be used where reclamation is unreasonable, unnecessary or impossible (52 P.S. §1396.18(b); 25 *Pa. Code* §86.190(a)).

The interest, however, that has accrued on these bond forfeitures can be used for the reclamation of land and the restoration of water supplies of any site affected by surface mining operations on

sites where the department has forfeited bonds. The interest is used as a financial supplement in the reclamation and restoration of bond forfeiture sites. (25 Pa. Code §86.187(a)(2)).

Existing balances in the SMCR Fund are presented in Table 25.

Table 25
Balances in SMCR Fund, December 1999 (in thousands)

Category	Dec 1999 Balance
Forfeited Bonds (Main Account)	17,625
Forfeited Bonds (Special Account)	3,278
Reclamation Fees	2,268
Authorized for current expenditures	3,232
Released Bonds	561
Total	26,692

Table 26 summarizes the recent average annual revenue to the Surface Mining Conservation and Reclamation Fund by category. The summary excludes proceeds from bond forfeitures because these funds are restricted to expenditures on the sites for which the bonds were posted. As has been previously discussed, the income from reclamation fees is available only to supplement site-specific bonds. In recent years, this income has averaged \$680,000 annually. The remaining categories of income – licenses, fees, fines, penalties and interest – are also authorized for use in supplementing expenditures for site-specific bond forfeitures. However, these categories are additionally authorized for expenditures in support of the Remining Operators Assistance Program (ROAP) and for administrative expenses related to the operation of the bond forfeiture program. In recent years, the revenue from these categories has averaged approximately \$2 million annually. Further, a total of \$450,000 in financial support has been provided for the ROAP program.

Table 26
Average Annual Revenues into the SMCR Fund for 1995 – 1999 (excluding forfeited bonds)

Source of Revenue	Average Annual Revenue	Allowable Uses
Reclamation Fees	\$680,000	<ul style="list-style-type: none"> • Supplement shortfall on any site-specific bond • Supplement shortfall on any site-specific bond • Other uses, including support for ROAP and administrative expenditures
Licenses & Fees	\$170,000	
Fines & Penalties	\$192,000	
Interest Income	\$1,600,000	
Total	\$2,662,000	

The Coal Refuse Disposal Control Fund

Section 14 of the Coal Refuse Disposal Control Act (CRDCA) establishes the Coal Refuse Disposal Control (CRDC) Fund (52 P.S. §30.64). All fines, civil penalties, bond forfeitures and

fees collected are to be paid into the CRDC Fund (52 P.S. §30.64). Forfeited bond money from coal refuse disposal sites also is contributed to the CRDC Fund. (52 P.S. §30.56(b)).

The department is authorized to charge reasonable fees for coal refuse disposal applications and permits in accordance with regulations (Section 5(b) (52 P.S. §55(b)) and Section 6(a) (52 P.S. §56(a))) and requires self-bonding permittees to pay an annual review fee. The amount of the annual review fee is to be determined by the department. Section 86.17 of the regulations establishes various fees and Section 86.159(3) establishes the annual review fee for self-bonding permittees. Sections 11 and 12 of the CRDCA (52 P.S. §§30.61 and 30.62) authorize the assessment of fines and civil penalties. Subchapter G of Chapter 86 of the regulations contains provisions governing the assessment of civil penalties under the Coal Refuse Disposal Control Act.

Section 14 of the CRDCA provides the CRDC Fund “shall be administered by the department for use in the elimination of pollution, the abatement of health and safety hazards and nuisances and such other purposes as are necessary to implement the provisions of the Act (CRDCA) pursuant to the rules and regulations adopted by the Environmental Quality Board” (52 P.S. §30.64). Section 86.3, the regulations adopted by the Environmental Quality Board, provides that the money in the CRDC Fund “may be used by the department for the elimination of pollution, the abatement of health and safety hazards and nuisances, reclamation and other related uses including conducting scientific studies and research as authorized under the Coal Refuse Disposal Control Act.” Section 6(a)(8) authorizes the department to require a self-bonding permittee to pledge real and personal property to guarantee the self-bond and authorizes the department to use CRDC Fund money to acquire and dispose of such property in the event of default.

Whereas Chapter 86 of the regulations contains general provisions that apply to coal mining activities, most of the provisions governing bond forfeiture are limited to SMCRA and the SMCR Fund. Sections 86.187-86.190 are specifically limited to the use of money in the SMCR Fund. Sections 86.181, 86.182 and 86.185 are generally applicable to coal mining activities except where the provisions are contrary to the provisions of the CRDCA governing the use of money in the CRDC Fund or BMSLCA governing the use of money in the BMSLC Fund.

The current balance in the Coal Refuse Disposal Control Fund is approximately \$680,000. Table 27 is a summary of recent average annual revenue into the fund. As shown in the table, income, including proceeds from bond forfeitures, has been less than \$100,000 annually.

Table 27
Average Annual Revenues into the Coal Refuse Disposal Control Fund for
1995 – 1999 (including forfeited bonds)

Source of Revenue	Average Annual Revenue	Allowable Uses
License & Fees	\$22,000	Supplement shortfall on any site-specific bond
Fines & Penalties	\$5,500	
Forfeited Bonds	\$65,500	For bonded coal refuse disposal sites
Total	\$93,000	

The Bituminous Mine Subsidence and Land Conservation Fund

Section 17.2 of the Bituminous Mine Subsidence and Land Conservation Act (BMSLCA) establishes the Bituminous Mine Subsidence and Land Conservation Fund (BMSLC Fund). (52 P.S. §1406.17b). All funds received by the department from permit fees, forfeiture of bonds, cash deposits and securities, and from all fines and all civil penalties collected under BMSLCA are to be held in the BMSLC Fund. However, Section 315(b) of the Clean Streams Law (CSL) (35 P.S. §691.315(b)) provides that if the operator was engaged in the operation of a deep mine at the time of violation which resulted in bond forfeiture, then the funds are to be paid into the Clean Water Fund. Generally, the CSL provision has been construed to apply to the bond posted for mine drainage.

Section 5(h) authorizes the department to collect reasonable filing fees for applications in accordance with rules and regulations, and Section 6(b)(13) requires self-bonding permittees to pay an annual fee in an amount determined by the department. Section 86.17 of the regulations establishes various fees and Section 86.159(3) establishes the annual review fee for self-bonding permittees. Section 17 of BMSLCA authorizes the assessment of fines and penalties. Subchapter G of Chapter 86 of the regulations contains provisions governing the assessment of civil penalties under BMSLCA. (Also under CRDCA, CSL and SMCRA.)

Section 17.2 of BMSLCA provides that the money in the BMSLC Fund “shall be used by the department for the protection of the health, safety and general welfare of the people of the Commonwealth of Pennsylvania, and for the conservation of surface land areas which may be affected by the deep mining of bituminous coal.” Section 6(b)(8) authorizes the department to require a self-bonding permittee to pledge real and personal property to guarantee the permittees self-bond and; in the event of a default, the department is authorized to use BMSLC Fund money to acquire and dispose of such property.

While Chapter 86 of the regulations contains general provisions that apply to coal mining activities, most of the provisions governing bond forfeiture are limited to SMCRA and the SMCR Fund. Sections 86.187-86.190 are specifically limited to use of money in the SMCR Fund. Sections 86.181, 86.182 and 86.185 are generally applicable to coal mining activities, except where the provisions are contrary to the provisions of the BMSLCA governing the use of money in the BMSLC Fund or CRDCA governing the use of money in the CRDC Fund.

The current balance in the Bituminous Mine Subsidence and Land Conservation Fund is approximately \$230,000. Since 1990, the average annual revenue into the fund has been less than \$35,000.

The Clean Water Fund

Section 8 of the Clean Streams Law (CSL) establishes the Clean Water Fund (35 P.S. §8). The fund is the repository for all fines collected under the penal provisions of the CSL, all civil penalties collected under section 605, all permit fees except those imposed pursuant to sections 202, 203 and 207, and all bond forfeitures and costs recovered under section 315. The fund is to be used by the department for the elimination of pollution. Receipts from permit fees, fines and

penalties for deep mines and permit fees for surface mine drainage are deposited into the fund. However, the fund also receives revenues from many non-mining activities, and none of its assets are specifically designated for use on sites where reclamation is needed because of forfeitures.

Projections for Annual Primacy Forfeitures

Projected annual forfeitures of permits, estimates of the number of forfeited acres needing reclamation, the cost of reclamation and anticipated reclamation income to offset these costs have been determined for each of the activities covered by the bonding program. In order to develop realistic projections, an evaluation period of approximately four years was used (from December 1999 until the end of 2003). Results were then converted to annual values. Some projections are based on historical experience. Details that are relevant to the analyses in this section are presented in Table 28. This table includes a compilation of selected information presented in tables on pages 13, 16, 17 and 18. The methods used to develop projections vary by category of permit: details for each are discussed in the individual sections.

Table 28
Summary of Percentage of Forfeited Primacy Permit Acres
Needing Reclamation

Activity	Acres Forfeited	Acres Requiring Reclamation	% of Forfeited Acres Requiring Reclamation
Surface Coal	59,379	6,382	11
Coal Refuse Reprocessing	2,837	625	22
Coal Preparation Plant	981	609	62
Coal Refuse Disposal	1,361	449	33
Bituminous Underground	1,286	438	34

Alternative Bonding System

The assumptions and results related to activities covered by the alternative bonding system are summarized in Table 29.

Table 29
Summary of Annual Projected Forfeitures and Estimated Reclamation Costs
and Possible Income

	Surface Coal	Coal Refuse Reprocessing	Coal Preparation Plant	Surface Mining Total
Acres Projected to Forfeit	4,384	479	102	4,965
Acres DEP Required to Reclaim	237	90	41	368
Estimated Reclamation Cost per Acre	\$5,500	\$11,000	\$20,500	
Estimated Reclamation Cost	\$1,295,741	\$987,176	\$846,801	\$3,129,718
Bonds to be Collected	\$943,086	\$152,339	\$279,998	\$1,375,423
Reclamation Fees to be Collected	\$465,000	\$35,000	0	\$500,000
Land Reclamation Cost (Deficit) or Surplus	\$112,345	(\$799,837)	(\$566,803)	(\$1,254,295)

In the future, there will be completions and forfeitures of some of the permits that are now considered active. Likewise, there will be new permits issued during the same period. For the discussions that follow, the acreage changes due to rates of completion and forfeiture are considered equivalent to those due to new permitting. Rates of future and historical permit completion, as well as future rates of forfeiture, will be analyzed and updated annually to confirm or revise future projections and the necessary supplemental income needed to ensure complete reclamation of future forfeitures.

Surface Coal Permits

There are currently 702 primacy surface coal mining permits that are theoretical candidates for forfeiture in the future. This inventory includes permit sites that are actively mining, sites that have not started yet, and sites that are in a state of approved cessation. The total area associated with these permits is 168,926 acres.

Historically, approximately 10% of all primacy surface coal permit acres have been forfeited since 1982. (See Table 4 on page 13). Applying this percentage to the 168,926 acres yields a potential 17,537 acres that possibly could be forfeited from now through the year 2003. On an annual basis, the potential forfeiture is 4,384 acres.

Since 1982, approximately 11% of forfeited primacy surface coal permit acres have required reclamation (see Table 28). Assuming a similar trend for the future, approximately 471 surface coal acres forfeited will require reclamation annually. Repermitting and reclamation undertaken by others have accounted for 50% of the land reclamation needed, leaving approximately 50% of forfeited primacy surface coal permit sites to be reclaimed with resources from the alternative bonding system. Consequently, the future need for reclamation is likely to be approximately 237 surface coal acres annually.

The historical record of average bond proceeds per acre needing reclamation for all surface coal permits has been approximately \$4,351. Since primacy, the department has collected approximately 92% of forfeited bonds for all forfeited surface coal permits. Using these factors, the projected annual revenue from forfeited bonds for the 237 acres needing reclamation is \$943,086. This amount would be applied toward the anticipated reclamation costs.

The department should expect also to collect \$465,000 in reclamation fees annually, at a rate of \$100 per newly permitted surface coal acre. Combined with the estimated bond amount that should eventually be collected from surface coal permits projected to be forfeited, an annual total of \$1,408,086 would be available to apply toward anticipated future surface coal reclamation costs.

The estimated annual reclamation obligation is determined by applying the \$5,500 average cost per acre needed to reclaim forfeited surface coal permit sites to the projected annual 237 acres that may need to be reclaimed with resources from the alternative bonding system. Thus, the projected total reclamation cost for new surface coal permit forfeitures will be approximately \$1,295,741 annually.

With the anticipated reclamation fees and forfeited bonds to be collected for surface coal permit forfeitures, there will be an annual reclamation income surplus of \$112,345. This estimate excludes costs associated with the prevention of water pollution.

Coal Refuse Reprocessing Permits

There are currently 142 primacy coal refuse reprocessing permits that have the potential for forfeiture in the future. This inventory includes permit sites that are active, have not started or are in a state of approved cessation. The total area associated with the potentially affected permitted coal refuse reprocessing acres is 24,613 acres.

Historically, approximately 8% of all primacy coal refuse reprocessing permit acres have been forfeited since 1982. Applying this percentage to the 24,613 acres yields a potential 1,917 acres that possibly could be forfeited. On an annual basis, the potential forfeiture is 479 acres.

Historically, about 22% of forfeited primacy coal refuse reprocessing permit acres have had to be reclaimed. (See Table 28). Assuming a similar trend for the future, approximately 106 acres of coal refuse reprocessing permits will require reclamation annually. The alternative bonding system has been obligated to reclaim approximately 85% of all forfeited primacy coal refuse reprocessing permit sites. Consequently, approximately 90 acres of coal refuse reprocessing acres could require reclamation annually.

The historical record of average bond proceeds per acre needing reclamation for all coal refuse reprocessing permits has been approximately \$1,750. Since primacy, the department has collected approximately 92% of forfeited bonds for all forfeited coal refuse reprocessing permits. Using these factors, the projected annual revenue from forfeited bonds for the 90 acres needing reclamation is \$152,339. This amount would be applied toward anticipated reclamation costs for coal refuse reprocessing forfeitures.

The department should expect also to collect \$35,000 in reclamation fees annually, at a rate of \$100 per newly permitted acre. Combined with the estimated bond amount that should eventually be collected from coal refuse reprocessing permits projected to be forfeited, a total of \$187,339 annually would be available to apply toward anticipated future coal refuse reprocessing reclamation costs.

The estimated annual reclamation cost for coal refuse reprocessing forfeitures is determined by applying the \$11,000 average cost per acre needed to reclaim forfeited sites to the projected annual 90 acres that may need to be reclaimed. Thus, the projected total annual reclamation cost for new coal refuse reprocessing permit forfeitures will be approximately \$987,176.

With the anticipated reclamation fees and forfeited bonds to be collected for coal refuse reprocessing forfeitures, there will be an annual reclamation income deficit of \$799,837. This estimate excludes costs associated with the prevention of water pollution.

Coal Preparation Plant Permits

There are currently 72 primacy coal preparation plant permits that have the potential for forfeiture in the future. This inventory includes permit sites that are active, have not yet started or are in a state of approved cessation. The total area associated with these potentially affected permitted coal preparation plant permits is 1,868 acres.

Historically, approximately 21.9% of all primacy coal preparation plant permit acres have been forfeited since 1982. Applying this percentage to the 1,868 acres yields a potential 410 acres that possibly could be forfeited. On an annual basis, the potential forfeiture is 102 acres.

Historically, about 62% of forfeited primacy coal preparation plant permit acres have had to be reclaimed (See Table 28). Assuming a similar trend for the future, approximately 64 acres of coal preparation plant acres will require reclamation annually. Approximately 65% of all forfeited primacy coal preparation plant permit sites have been left to be reclaimed with resources from the alternative bonding system. Consequently, approximately 41 coal preparation plant acres could be expected to need reclamation annually.

The historical record of average bond proceeds per acre for all coal preparation plant permits has been approximately \$8,473. The department expects to collect all outstanding funds from the forfeiture of coal preparation plant permits in the future. However, for the reasons discussed in the previous section (see page 28), this analysis is based on a more conservative collection rate of 80%. Using these factors, the projected annual revenue from forfeited bonds for the 41 acres needing reclamation annually is \$279,998. This amount would be applied toward the anticipated obligation reclamation costs. The department does not collect reclamation fees from coal preparation plant permits.

The estimated annual reclamation obligation for coal preparation plant forfeitures is determined by applying an average total cost per acre of \$20,500, determined from averaging anticipated costs to reclaim 10 currently forfeited sites, to the projected annual 41 acres that may need to be reclaimed. Thus, the projected total annual reclamation cost for new coal preparation plant permit forfeitures will be approximately \$846,801.

With the anticipated forfeited bonds to be collected for coal preparation plant forfeitures, there will be an annual reclamation income deficit of \$566,803. This estimate excludes costs associated with the prevention of water pollution.

Full-Cost Bonding System - Coal Refuse Disposal Permits

There are currently 52 primacy coal refuse disposal permits that have the potential for forfeiture in the future. This inventory includes permit sites that are active, have not started yet or are in a state of approved cessation. The total area associated with these potentially affected permitted coal refuse disposal permits is 8,000 acres.

Historically, approximately 10.5% of all primacy coal refuse disposal permit acres have been forfeited since 1982. Applying this percentage to the 8,000 acres yields a potential 840 acres that possibly could be forfeited. On an annual basis, the potential forfeiture is 210 acres.

Historically, about 33% of forfeited primacy coal refuse disposal permit acres have had to be reclaimed. (See Table 28). Assuming a similar trend for the future, approximately 69 acres of coal refuse disposal permits will require reclamation annually. In the past, other parties have reclaimed approximately 47% of forfeited primacy coal refuse disposal permit sites, leaving 53% to be reclaimed by the bonding program. Consequently, it is anticipated that approximately 36 coal refuse disposal acres would need to be reclaimed annually with resources from the bonding program.

The historical record of average bond proceeds per acre needing reclamation for all coal refuse disposal permits has been approximately \$2,913. Since primacy, the department has collected approximately 91% of forfeited bonds for all forfeited coal refuse disposal permits. Using these factors, the projected annual revenue from forfeited bonds for the 36 acres needing reclamation annually is \$96,682. This amount would be applied toward the department's anticipated reclamation costs. The department does not collect reclamation fees from coal refuse disposal permits.

The estimated annual reclamation cost for coal refuse disposal forfeitures is determined by applying the estimated \$20,000 average cost per acre needed to reclaim forfeited sites to the projected annual 36 acres that may need to be reclaimed. Thus, the projected total annual reclamation cost for new coal refuse reprocessing permit forfeitures will be approximately \$729,386.

With the anticipated forfeited bonds to be collected for coal refuse disposal forfeitures, there will be an annual reclamation income deficit of \$632,704. This estimate excludes costs associated with the prevention of water pollution.

Full-Cost Bonding System - Underground Mining Permits

Because of the pronounced differences in the size of surface areas associated with anthracite and bituminous underground mines and the different reclamation costs involved, the projected costs for reclamation of these two types of underground mines are discussed separately. In order to develop realistic projections, an evaluation period of approximately four years was used (until the end of 2003). Results were then converted to annual values.

Anthracite Underground Mining Permits

There are currently 57 active anthracite underground permits. The historical forfeiture rate for anthracite underground permits is 6.3%. (This rate is based on the number of permits, not acreage). The bonding program has been left to reclaim 88% of all anthracite permit forfeitures. This means that in the future four of the 57 active permits may need to be reclaimed. BAMR cost estimates to reclaim five of the already forfeited anthracite underground mine sites range

from \$20,000 to \$27,500 per site. The average BAMR estimated cost to reclaim an anthracite underground mine site is \$21,800. The total estimated cost to reclaim the four anticipated forfeitures of active permits is therefore \$87,200.

The current total bond amount for all active anthracite underground mine permits is \$446,155, with the average bond amount per active site being \$7,827. Thus, the projected bond proceeds from forfeitures of four permit sites is \$31,309. Historically, the department has collected 100% of all forfeited primacy anthracite underground mine bonds. Assuming this collection rate for the future results in proceeds of \$31,309 for the four forfeitures. The difference between this amount and the estimated cost to reclaim four anthracite underground permit sites is a deficit of \$55,891. On an annual basis through the year 2003, the deficit would be \$13,973. These details are summarized in Table 30.

With the anticipated collection of forfeited bonds for anthracite underground mine forfeitures, there will be an annual reclamation deficit of \$13,973. This estimate excludes costs associated with the prevention of water pollution.

Table 30
Summary of Forfeitures and Reclamation Costs for Anthracite Underground Mine Permits

"Active" Anthracite Underground Mine Permits	57
Percentage of Permits Forfeited	6.3%
Percentage of Forfeited Permits with bond program reclamation	87.5%
Number of Permits to Forfeit with bond program reclamation	4
Anticipated Reclamation Cost 2000-2003 Forfeitures	\$87,200
Estimated Bonds on Forfeited Permits for Bond Program Reclamation	\$31,309
Percentage of Forfeited Bonds Collected by DEP	100%
Estimated Bonds to be Collected from Forfeitures	\$31,309
Estimated Deficit for Reclamation of Forfeited Permits	(\$55,891)
Annual Reclamation Deficit	(\$13,973)

Bituminous Underground Mining Permits

There are currently 81 active bituminous underground permits. The permitted and affected surface areas of bituminous underground mines are much more variable than for anthracite mines. For this reason, rates of forfeiture and associated reclamation costs are described by permit acreage, not the number of permits or cost per site. The historical forfeiture rate for bituminous underground permit acreage is 2.6%. Applying this percentage to the 28,056 acres of the active bituminous underground mine permits indicates that approximately 729 acres could be forfeited.

Historically, approximately 34% of all forfeited bituminous underground mine surface acres have had to be reclaimed. (See Table 28). This suggests that about 248 acres could require reclamation. The bonding program has been left to reclaim 36% of all forfeited bituminous

underground mine acreage. This means that the bonding program could be expected to reclaim 90 acres from future forfeited bituminous underground mines.

BAMR cost estimates to reclaim already forfeited bituminous underground mine sites range from \$11,363 to \$77,922 per acre. The average BAMR estimated cost to reclaim a bituminous underground mine site is \$34,342 per acre. The total estimated cost to reclaim the 90 acres due to anticipated forfeitures that may need to be reclaimed is \$3,074,691.

The current total bond amount for all active bituminous underground mine permits is \$60,490,198. The average bond amount per active site is \$746,793. Historically, the average value of bonds available on forfeited bituminous underground sites that the bonding program has been left to reclaim is \$6,484. Using this average, the department would have \$583,560 in bonds available for use on the 90 acres projected to need reclamation. The department has been able to collect approximately 100% of all previously forfeited primacy bituminous underground mine bonds. Applying this historical collection rate to the total bond amount indicates that approximately \$583,560 should be collected. The difference between this amount and the estimated cost to reclaim 90 acres of forfeited bituminous underground mine sites is a deficit of \$2,491,131. On an annual basis, the deficit would be \$622,783. These details are summarized in Table 31.

With the anticipated collection of forfeited bonds for bituminous underground mine forfeitures, there will be an annual reclamation deficit of \$622,783. This estimate excludes costs associated with the prevention of water pollution.

**Table 31
Summary of Forfeitures and Reclamation Costs for Bituminous
Underground Mine Permits**

“Active” Bituminous Underground Mine Acres	28,056
Percentage of Permit Acres Forfeited	2.6%
Percentage of Forfeited Acres Requiring Reclamation	34.0%
Percentage of Forfeited Acres with Bond Program Reclamation	36.1%
Number of Forfeited Acres with Bond Program Reclamation	90.0
Anticipated Reclamation Cost 2000-2003 Forfeits	\$3,074,691
Estimated Bonds on Forfeited Permits for Bond Program Reclamation	\$583,560
Percentage of Forfeited Bonds Collected by DEP	100%
Estimated Bonds to be Collected from Forfeitures	\$583,560
Estimated Deficit for Reclamation of Forfeited Permits	(\$2,491,131)
Annual Reclamation Deficit	(\$622,783)

This publication and related environmental information are available electronically via Internet. For more information, visit us through the Pennsylvania homepage at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (directLINK "Mining").



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